

Seasonal incidence and abundance of pod borers in *Dolichos* bean, *Lablab purpureus* L. (Sweet) in Bengaluru, Karnataka, South India

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Lablab purpureus L. (Sweet) is an important pulse-cum-vegetable crop in India, cultivated for tender pods, seeds and fodder. Govindan (1974) in Karnataka recorded as many as 55 species of insect pests and a species of mite. Among them, the pod borers were considered to be the most important and they appeared regularly causing crop loss to the tune of 80-100 per cent (Katagihallimath and Siddappaji, 1962). The pod borers of *Dolichos* bean include *Helicoverpa armigera* (Hubner), *Adisura atkinsoni* (Moore), *Maruca testulalis* (Geyer), *Etiella zinckenella* (Treitschke), *Sphenarches caffer* (Zeller), *Exelastis atomosa* (Walshingham), *Callosobruchus chinensis* (Linnaeus) and *Lampides boeticus* (Linnaeus) (Chakravarthy, 1977; Mallikarjunappa, 1989). The present study was taken up to study the seasonal incidence and abundance of the pod borers in *Dolichos* bean.

Experiments were conducted at Zonal Agricultural Research Station, University of Agricultural Sciences, Bengaluru (13° N, 77° 35' E, 930 m amsl) during September 2008-January 2009. HA-3, a popular *Dolichos* bean hybrid was sown during third week of August in 400 m² area to record the seasonal incidence of pod borers. The study area was divided into four quadrates of equal size (2m² x 4 quadrates).

Observations on number of larvae per 10 plants at each quadrate were made at weekly intervals commencing from 50% of flowering (45 days after sowing) to pod maturing stage. Immature stages of different pod borers occurred on the crop were collected and reared in the laboratory under optimum conditions (25±1° temperature, 80-85% RH and 12 h day light) till adult emergence to confirm the species identity. ANOVA was carried out by treating quadrates as replications and date of observation as treatments to know the differences among dates of observations.

A total of eight different pod borer species belonging to eight different genera were recorded on *Dolichos* beans in Bengaluru (Table-1 and Fig.1). Among the pod borers, *Helicoverpa armigera* Hubner was found to be the major and its numbers and dominance overwhelmingly prepondered over other species. The incidence of *H. armigera* started from pod formation stage and reached peak during second week of November (Pod maturing stage) 2008 with a mean of 80.5 larvae per 10 plants, significantly higher from other weeks. The incidence of *Adisura atkinsoni* started in the late pod maturity stage *i.e.* first week of November, 2008 and reached peak during last week of December (Pod

maturing stage), 2008 with a mean incidence of 42 larvae per 10 plants. The incidence of *Maruca testulalis* and *Etiella zinckenella* peaked during first week of December, 2008 with a mean of 34 larvae and 31.50 larvae per 10 plants, respectively. The adults of *Callosobruchus chinensis* were found hovering over the flowers and its incidence was observed during flowering stage also and reached peak during first week of December, 2008 with a mean of 24.50 adults per 10 plants (Table-2).

These findings are in agreement with Govindan (1974), Chakravarthy (1977) and Mallikarjunappa (1989) who recorded ten pod borers viz., *A.atkinsoni*, *H.armigera*, *S.caffer*, *E.zinckenella*, *M.testulalis*, *L.boeticus*, *Cydia ptychora*, *Melanagromyza obtusa* and *Callosobruchus theobromae* throughout cropping season. The incidence of *H.armigera* observed from the beginning of flowering i.e. from bud formation stage to pod maturation stage and it reached peak during third week of November, 2008 which was in line with the findings of Bhojar (2004) and Rekha (2005). But, Yadav *et al.* (1986) observed its peak period of infestation from December to February on field beans at Anand (Gujarat). The variations in seasonal incidence of pod borers may be due to change in the location as well as weather conditions.

The incidence of *A. atkinsoni* started in the late pod maturity stage i.e. first week of November, 2008 and reached peak during last week of December, 2008 whereas, Chakravarthy (1977) and Mallikarjunappa (1989) recorded it throughout the cropping season and reported it as major pod borer on

field bean. The incidence of *M.testulalis* and *E.zinckenella* were peak during first week of December, 2008 which was in close agreement with Rekha (2005) in Dharwad region, while Lalasangi (1984) reported the incidence of *M. testulalis* during July, August and October in Bangalore. This variation might be due to change in season, crop and biotic/abiotic factors.

The seasonal incidence of plume moths viz., *S.caffer* and *E.atomosa* was observed right from the budding stage and peak incidence was observed during second week of November, 2008 and third week of November, 2008, respectively. These findings are in agreement with Krishnamurthi and Appanna (1951) who reported the occurrence of *S.caffer* from October to January. Rekha (2005) reported the incidence of *E.atomosa* during December in Dharwad which might be again due to change in location, cropping pattern, availability of other pulse crops and abiotic factors. The adults of *C.chinensis* reached peak during first week of December, 2008 which is in conformity with the findings of Mallikarjunappa (1989).

ACKNOWLEDGEMENTS

The first author is grateful to Indian Council of Agricultural Research (ICAR) for awarding Junior Research Fellowship towards M.Sc degree programme and also to the advisory committee and other authorities of University of Agricultural Sciences, Bengaluru for providing facilities and encouragement.

Table 1: Pod borers recorded on Dolichos bean

Sl. No	Pod borer species	Larval/Adult taxonomy	Remarks
1	Gram pod borer, <i>Helicoverpa armigera</i> Hubner (Noctuidae:Lepidoptera)	Larvae variously coloured with dark broken grey lines along the lateral side	Dominant, found throughout cropping season, polyphagous
2	Field bean pod borer, <i>Adisura atkinsoni</i> Moore (Noctuidae:Lepidoptera)	Larvae greenish with brown Stripes laterally and slightly humped anal segment	Minor, late in occurrence, specific and monophagous
3	Spotted pod borer, <i>Maruca testulalis</i> Geyer (Pyralidae: Lepidoptera)	Larvae were small, brownish green with black warts on body	Minor, occurred during pod setting stage, oligophagous
4	Tur plume moth, <i>Exelastis atomosa</i> Walshingham (Pterophoridae: Lepidoptera)	Larvae small, greenish brown. Body was fringed with hairs and tapering at both ends	Minor, recorded from budding stage
5	Plume moth, <i>Sphenarches caffer</i> Zeller (Pterophoridae: Lepidoptera)	Larvae similar to tur plume moth but greenish body	Minor, recorded from budding stage
6	Blue butterfly, <i>Lampides boeticus</i> Linnaeus (Lycaenidae:Lepidoptera)	Larvae flat, greenish with red line on dorsum	Minor, peak incidence during December
7	Spiny pod borer, <i>Etiella zinckenella</i> Treitschke (Pyralidae: Lepidoptera)	Larvae pinkish with 5 black spots on prothoracic segment	Minor, found to infest during later stages
8	Pulse beetle, <i>Callosobruchus chinensis</i> Linnaeus Bruchidae: Coleoptera	Adults small sized, dark grayish with black spots on elytra.	Adults recorded on flowers and green pods

Table-2: Pod borers of Dolichos bean during September, 2008-January, 2009 in Bengaluru

Date of observation	<i>H.a</i>	<i>A.a</i>	<i>M.t</i>	<i>E.z</i>	<i>S.c</i>	<i>E.a</i>	<i>L.b</i>	<i>C.c</i> **
	Mean number of larvae per 10 plants*							
29/09/08	40.50 ^f	00 ^h	00 ^g	00 ^g	15.50 ^{de}	01.00 ⁱ	00 ^g	00 ^h
05/10/08	43.50 ^f	00 ^h	00 ^g	00 ^g	16.00 ^{de}	06.00 ^{gh}	00 ^g	00 ^h
12/10/08	44.00 ^f	00 ^h	00 ^g	00 ^g	16.50 ^{de}	09.00 ^{fg}	00 ^g	00 ^h
19/10/08	52.50 ^e	00 ^h	00 ^g	02 ^f	18.00 ^{cde}	10.00 ^{fg}	00 ^g	01.50 ^{fgh}
26/10/08	53.00 ^e	00 ^h	07.00 ^e	04.50 ^f	18.00 ^{cde}	19.00 ^{cd}	00 ^g	04.00 ^e
02/11/08	61.50 ^{cd}	01.50 ^h	09.00 ^{de}	10.00 ^e	16.50 ^{de}	13.50 ^{def}	00 ^g	05.00 ^e
09/11/08	63.50 ^{bcd}	04.00 ^g	10.50 ^d	13.50 ^d	16.50 ^{de}	23.50 ^{bc}	04 ^f	09.50 ^d
16/11/08	80.50 ^a	08.50 ^f	15.00 ^c	18.00 ^c	32.00 ^a	27.00 ^b	07.00 ^e	13.50 ^c
23/11/08	70.50 ^b	14.00 ^e	22.00 ^b	22.00 ^b	27.00 ^{abc}	35.50 ^a	11.00 ^d	15.50 ^{bc}
30/11/08	66.00 ^{bc}	19.00 ^d	31.50 ^a	28.50 ^b	30.00 ^{ab}	29.00 ^{ab}	13.50 ^d	19.50 ^{ab}
07/12/08	60.50 ^{cd}	23.50 ^c	34.00 ^a	31.50 ^a	27.50 ^{abc}	21.50 ^{bc}	17.50 ^c	24.50 ^a
14/12/08	56.00 ^{de}	31.00 ^b	25.00 ^b	21.50 ^a	25.50 ^{abcd}	17.50 ^{cde}	24.50 ^b	24.00 ^a
21/12/08	42.00 ^f	34.50 ^b	23.50 ^b	18.50 ^b	22.50 ^{abcd}	13.00 ^{ef}	30.00 ^a	18.00 ^b
28/12/08	31.00 ^g	42.00 ^a	16.00 ^c	14.00 ^b	20.50 ^{bcd}	06.00 ^{gh}	21.50 ^b	09.00 ^d
04/01/09	17.00 ^h	32.00 ^b	9.50 ^{de}	08.00 ^c	16.50 ^{de}	04.00 ^h	10.00 ^d	03.50 ^{ef}
11/01/09	11.50 ⁱ	16.50 ^{de}	4.00 ^f	02.50 ^d	10.00 ^{ef}	0.00 ⁱ	04.00 ^d	02.00 ^{fg}
18/01/09	04.50 ^j	04.00 ^g	0.00 ^g	0.00 ^f	05.50 ^f	0.00 ⁱ	0.00 ^g	01.00 ^{gh}
SEM±	0.11	0.09	0.11	0.10	0.23	0.16	0.11	0.12
CD (p=0.05)	0.32	0.25	0.31	0.31	0.67	0.48	0.33	0.36

* Mean of all the 4 quadrates (2 m² per quadrate) on 10 plants. **= adults

H.a-*Helicoverpa armigera*; *A.a*-*Adisura atkinsoni*; *M.t*-*Maruca testulalis*; *E.z*-*Etiella zinckenella*; *S.c*-*Sphenarches caffer*; *E.a*-*Exelastis atomosa*;
L.b-*Lampides boticus*; *C.c*-*Callosobruchus chinensis*;

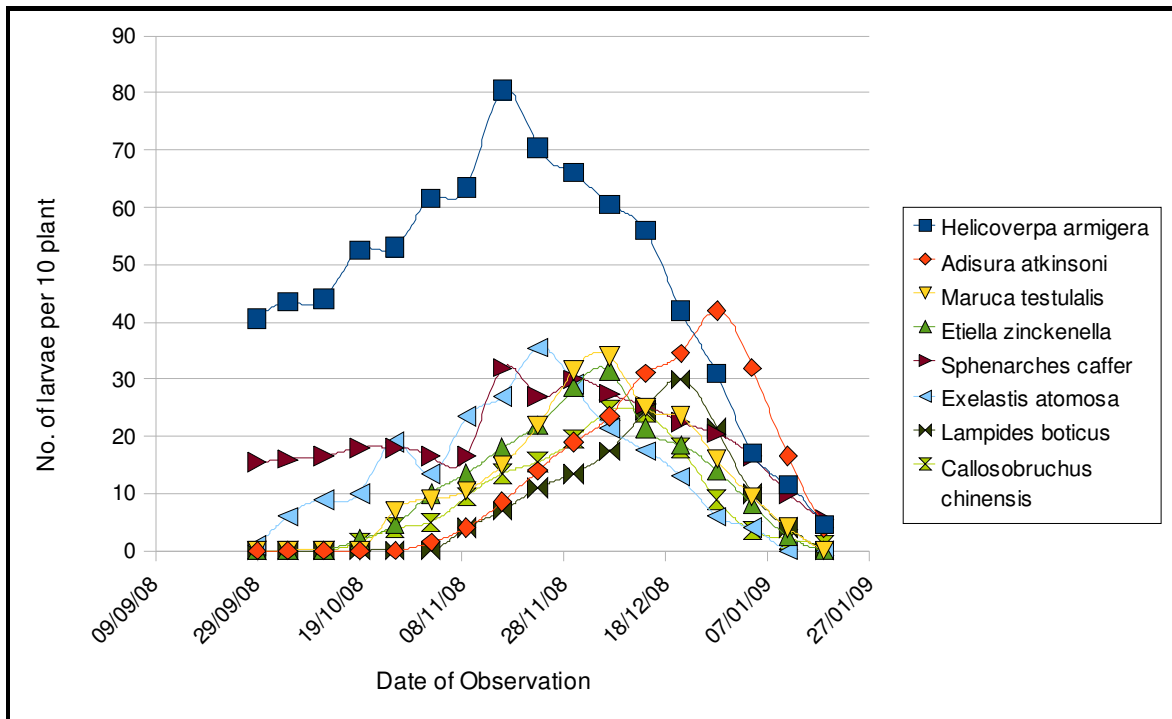


Fig.1: Pest incidence across the season

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[MS received 11 March 2012;
MS accepted 15 May 2012]

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